Glossary

Acid Deposition or Acid Rain - A mixture of wet and dry material deposited from the atmosphere containing higher than "normal" amounts of nitric and sulfuric acids. The chemical forerunners of acid rain formation result from both natural sources - such as volcanoes and decaying vegetation - and man-made sources, primarily emissions of sulfur and nitrogen oxides resulting from fossil fuel combustion.

Anthracite- A coal having high carbon content and low volatile matter that burns with a clean flame. Also called "hard coal".

Biological Cleaning - A precombustion technology where sulfur in coal is "eaten" by bacterial organisms.

Bituminous Coal - A middle rank coal (between subbituminous and anthracite) formed by additional pressure and heat on lignite. Usually has a heat value of between 11,500 and 14,000 Btu/lb and may be referred to as "soft coal."

Btu - British thermal unit; A measure of the energy required to raise the temperature of one pound of water one degree Fahrenheit.

Byproducts - Useful substances made from the solids, liquids and gases left over when coal is burned or when coal is changed into coke which is used as a fuel and in making steel.

Caprock – A comparatively impervious stratum that immediately overlies an oil- or gas-bearing rock.

Carbon Capture Sequestration (CCS) – The process of capturing and storing carbon dioxide in reservoirs such as depleted oil and gas reservoirs, deep coal seams or deep saline reservoirs.

Chemical Cleaning - A precombustion technology in which sulfur and other impurities in coal are removed by chemical processes.

Clean Air Act Amendments of 1990 - A comprehensive set of amendments to the federal law governing the nation's air quality. The Clean Air Act was originally passed in 1970 to address significant air pollution in our cities. The 1990 amendments broaden and strengthen the original law to address specific problems such as acid deposition, urban smog, hazardous air pollutants, and stratospheric ozone depletion.

Clean Coal Technologies - A number of innovative, new technologies designed to use coal in a more efficient and cost-effective manner while enhancing environmental protection. Several promising technologies include: fluidized bed combustion, integrated gasification combined cycle, limestone injection multistage burner, enhanced flue gas desulfurization (or "scrubbing"), coal liquefaction and coal gasification.

Coal Beneficiation - Coal treatment, cleansing or preparation to remove mineral or ash material.

Coal Gasification - The conversion of coal into a gaseous fuel.

Coal Seam - A "bed" or stratum of coal. The term "seam" is usually applied to a large deposit of coal.

Coal Washing- The process of separating undesirable materials from coal based on differences in densities. Pyritic sulfur, or sulfur combined with iron, is heavier and sinks in water; coal is lighter and floats.

Column Flotation - A precombustion coal cleaning technology in which coal particles attach to air bubbles rising in a vertical column. The coal is then removed at the top of the column.

Combined-Cycle Coal Gasification - A coal conversion technology in which gas derived from coal is used to fire gas turbines and drive steam turbines.

Combustion Technology - A technology where sulfur and other impurities in coal are removed as the coal is burned in the boiler or combustor.

Continuous Mining - One of three major underground mining methods now used in the United States. This process uses a machine called a "continuous miner" that mechanizes the entire coal extraction process. The continuous miner uses a rotating cylindrical drum fitted with bits that removes or "cuts" the coal from the seam. Large arms under the cutting head rake the coal onto a conveyor for removal to a shuttle car to be transported to a larger conveyor belt system.

Conventional Mining - The first fully mechanized underground mining method involving the insertion of explosives in a coal seam, the blasting of the seam and removal of the coal onto a conveyor or shuttle car by a loading machine.

Conversion Technology - A technology where coal combustion is converted into a gas or liquid that can be cleaned and used as a fuel.

Deep saline reservoir – A porous rock deep in the subsurface that is saturated with hyper-saline fluids.

Dragline - A large excavation machine used in the surface mining process to remove overburden, or layers of earth and rock, covering a coal seam. The dragline has a large bucket suspended from the end of a huge boom which may be as long as 275 feet. These machines, which “walk" on huge pontoon-like "feet," are among the largest land-based machines in the world. Currently, no draglines are used for mining coal in Illinois although the machines have been used in the past.

Drift Mine -An underground mine in which the entry or access goes directly into a horizontal coal seam exposed at or near the surface, usually in a hillside or as an extension of a surface mine.

Economy -The careful or thrifty use or management of resources, such as income, material, or labor.

Enhanced Coal Bed Methane (ECBM) – A process in which carbon dioxide is injected into coal beds to displace methane molecules absorbed into the surface of the coal. The methane can be recovered for use as natural gas.

Enhanced Oil Recovery (EOR) – Describes three methods (thermal, miscible and chemical) used to produce oil from remaining reserves in the ground after primary and secondary recovery has been completed. The thermal process can include steam simulation (“huff and puff”), steam flooding and in-situ combustion. Miscible methods involve injection of various materials such as hydrocarbons, carbon dioxide, and nitrogen. Chemical recovery methods include flooding with polymers, surfactants and alkaline fluids.

Face - The exposed area of a coal seam from which coal is being extracted.

Fluidized Bed Combustion - A process with a high degree of ability to remove sulfur from coal during combustion. Crushed coal and limestone are suspended in the bottom of a boiler by an upward stream of hot air. The coal is burned in this bubbling, liquid-like (or "fluidized") mixture. Sulfur released from the coal during combustion combines with the limestone to form a solid compound recovered with the ash.

Fly Ash - The finely divided particles of ash suspended in gases resulting from the combustion of fuel. Electrostatic precipitators are used to remove fly ash from these gases prior to their release from a power plant's smokestack.

Fossil Fuel - Any naturally occurring fuel of an organic nature, such as coal, crude oil and natural gas.

Flue Gas - The mixture of gases that result from the combustion of coal.

Flue Gas Desulfurization - Any of several forms of chemical or physical processes which remove sulfur compounds formed during coal combustion. The devices, commonly called "scrubbers," combine the sulfur in gaseous emissions with another chemical medium to form inert "sludge" which must then be removed for disposal.

Gasification - Any of various processes by which coal is turned into low-, medium- or high-Btu gas.

Geological sequestration – The storage of carbon dioxide in coal beds, saline or hydrocarbon reservoirs.

Global Climate Change - A gradual warming of the earth caused by the greenhouse effect. Many scientists believe this is the result of man-made emissions of green house gases such as carbon dioxide, CFCs, and methane.

Greenhouse Effect - A phenomena in which certain gases trap heat that would otherwise radiate into space. The greenhouse effect is a natural phenomenon necessary for life on Earth; without it, Earth's temperature would be too cold to support life. "Greenhouse gases" - including nitrous oxides, chlorofluorocarbons (CFCs), methane, tropospheric ozone and carbon dioxide (CO2) - absorb heat that would otherwise escape into space and return some of it to the earth's surface, increasing the average temperature.

Greenhouse Gases - Any of a number of gases that contribute to the greenhouse effect by their ability to allow sunlight to penetrate to the earth, but trap the heat radiated from the earth's surface.

Highwall – An excavated face of exposed overburden and coal in a surface mine or in a face or bank on the uphill side of a contour mine excavation.

Induct Sorbent Injection - A post combustion technology in which limestone is sprayed into the ductwork between the boiler and smokestack to absorb sulfur and other impurities from the flue gas.

Inspection and Enforcement - As applied to mining, a procedure used by the Illinois Department of Mines and Minerals to monitor and regulate coal mining companies.

Lignite - A low rank coal formed from peat characterized by high moisture and low heat value.

Liquefaction - The process of converting coal into a synthetic liquid fuel, similar in nature to crude oil and/or refined products, such as gasoline.

Longwall Mining - One of three major underground coal mining methods currently in use. A shearer, or rotation drum, travels back and forth across a face of coal that is usually several hundred feet long. The loosened coal falls onto a conveyor for removal from the mine.

Methane - A potentially explosive gas formed naturally from the decay of vegetative matter, similar to that which formed coal. Methane, which is the principal component of natural gas, is frequently encountered in underground coal mining operations and is kept within safe limits through the use of extensive mine ventilation systems.

Molten-caustic Leaching - A precombustion technology where sulfur and other impurities in finely ground coal are removed with a high temperature molten salts solution.

National Acid Precipitation Assessment Program (NAPAP) - An extensive national research effort that brought together the expertise of many federal, state and local scientists in a cooperative 10-year study of the causes and effect of acid deposition.

Ocean sequestration - Two methods exist for storing carbon dioxide in the ocean. 1) pumping liquified CO_2 at least a thousand meters, or deeper, either directly from shore stations, or from tankers trailing long pipes at sea. At great depths, CO_2 is denser than the surrounding sea water, thus making it possible to store it on the bottom as either a liquid or an icy hydrate. 2) Using the CO_2 to "fertilize" the ocean. Near the surface, carbon is fixed by phytoplankton. As a result, the CO_2 becomes part of the food chain, and serves to "prime the biological pump" by causing the phytoplankton to flourish under the CO_2 rich conditions.

Organic Sulfur - Sulfur which is chemically bound to carbon in coal.

Outcrop - Coal which appears at or near the surface.

Overburden - Layers of earth and rock covering a coal seam. Overburden is removed prior to surface mining and replaced after the coal is taken from the seam.

Performance Bond - A financial agreement posted by a mine operator to ensure that reclamation will take place. If reclamation does not take place, the bond, or money, is forfeited to the government to make sure a site is reclaimed.

Permit - As it pertains to mining, a document that gives approval for mining operations to take place.

Physical Cleaning - A precombustion technology where sulfur and other impurities in coal are removed by a mechanical process.

Portal - Any entrance to an underground mine.

Postcombustion Technology- A technology where sulfur and other impurities released during the combustion of coal are cleaned from the flue gases as they pass from the boiler to the smokestack.

Precombustion Technology - A technology where sulfur and other impurities in coal are removed before the coal is burned.

Preparation Plant - A facility for crushing, sizing and washing coal to prepare it for use by a particular customer. The washing process has the added benefit of removing some of the coal's sulfur content. It is usually located on a mine site, although one plant may serve several mines.

Pryritic sulfur – The part of the sulfur in coal, which is in the form of pyrite or marcasite. Pyritic sulfur is inorganic sulfur and can be removed from the coal through physical washing.

Ranks of Coal - The classification of coal by degree of hardness, moisture and heat content: "Anthracite" is hard coal, almost pure carbon, used mainly for heating homes. "Bituminous" coal is soft, the most common type found in the United States, and is used to generate electricity and to make coke for the steel industry. "Subbituminous" is a coal with a heating value between bituminous and lignite, and has low fixed carbon and high percentages of volatile matter and moisture. "Lignite" is the softest coal and has the highest moisture content. It is used for generating electricity in certain parts of the country and for conversion into synthetic gas. In terms of Btu or "heating" content, anthracite has the highest value, followed by bituminous, subbituminous and lignite.

Reclamation - The restoration of land and environmental values to a surface mine site after the coal is extracted. Reclamation operations are usually underway where the coal has already been taken from a mine, even as mining operations are taking place elsewhere at the site. The process commonly includes "recontouring" or reshaping the land to its approximate original appearance, restoring topsoil and planting native grasses and ground covers.

Recoverable Reserves - The amount of coal that can be recovered from the demonstrated reserve base. The recovery factor for underground mines ranges from 40 to 85 percent; for surface mines, nearly complete recovery is achieved. There are about 267 billion tons of recoverable reserves in the United States, enough to last more than 240 years at current production levels.

Regulations - As applied to mining, rules which govern the operation of a coal mine.

Reservoir rock – Any porous and permeable rock that yields oil or gas. Sandstone, limestone and dolomite are the most common.

Rock Dust - A white dust made of powdered limestone which is applied to the walls of an underground mine. Its purpose is to contain or minimize explosions, aid in the lighting of the mine and reduce health hazards.

Roof Bolting - A method of supporting the ceilings of underground mines by inserting resin glue and long steel bolts into holes bored into the strata forming the roof.

Roof Support - Posts, jacks, roof bolts and beams used to support the rock overlying a coal seam in an underground mine. A good roof support plan is part of mine safety and coal extraction.

Room and Pillar Mining - A method of underground mining in which approximately half of the coal is left in place to support the roof of the active mining area. Large "pillars" are left while "rooms" of coal are extracted.

Scrubber - Any of several forms of chemical or physical devices which remove sulfur compounds formed during coal combustion. These devices, technically known as flue gas desulfurization systems, combine the sulfur in gaseous emissions with another chemical medium to form inert "sludge", which must then be removed for disposal.

Seal – A rock which impedes the upward mobility of oil or gas due to it's petrophysical properties, mainly low permeability.

Self-Contained Self Rescuer - A mask-like device which provides a minimum of 60 minutes of oxygen supply in the event of an underground mine emergency.

Self Rescuer (filter-type) - A canister-like device for immediate emergency use in the case of a fire or explosion. The filter converts highly toxic carbon monoxide into harmless carbon dioxide.

Shaft Mine -An underground mine in which the main entry or access is by means of a vertical shaft.

Shuttle Car - A vehicle, generally with rubber tires or tracs, used for receiving coal from the loading or mining machine and transferring it to an underground loading point, mine railway or belt conveyor system.

Sink – A porous rock, such as a sandstone or limestone, that acts as a reservoir or long-time repository, for a fluid or compound.

Slope Mine - A mine with an opening that slopes upward or downward to the seam. It must also have adjoining vertical shafts for air ventilation and emergency use.

Subbituminous Coal - A coal intermediate between lignite and bituminous with a heat value ranging from 8,300 to 11,500 Btu/lb.

Subsidence - The gradual sinking, or sometimes abrupt collapse, of the rock and soil layers into an underground mine. Structures and surface features above the subsidence area can be affected.

Surface Mine - A mine in which the coal lies near the surface and can be extracted by removing the covering layer of soil. About 60 percent of total U.S. coal production comes from surface mines.

Terrestrial sequestration - The storage of carbon dioxide in agricultural lands (i.e. croplands or grasslands), wetlands, forested lands, or degraded lands.

Topsoil - The dark, fertile uppermost layer of the soil.

Underground Gasification - The in-place gasification of coal deposits through partial combustion.

Underground Mine - Also known as a "deep" mine. Usually located several hundred feet below the earth's surface; an underground mine's coal is removed mechanically and transferred by conveyor to the surface. Most underground mines are located east of the Mississippi River and account for about 40 percent of annual U.S. coal production.